SYMPATRIC OCCURRENCE OF TWO SUBSPECIES OF *PANULIRUS LONGIPES* MILNE EDWARDS, 1868 (DECAPODA: PALINURIDAE) AND BIOCHEMICAL EVIDENCE OF INTERBREEDING

Panulirus longipes, a common tropical lobster in the Indo-West Pacific region belonging to the Japonicus group, was distinguished by George and Holthius (1965) into two forms based on the colour pattern of the legs, the 'spotted' and the 'striped'. Furthermore, they suggested that these forms be designated as subspecies, the 'spotted' form, *P. longipes longipes*, inhabiting the western part of the species range and the 'striped' form, *P. longipes femoristriga*, found in the eastern part. These workers, however, noted that the two forms could not be sharply separated because intermediate forms with striped and spotted legs occur. This paper reports the sympatric occurrence of the 'spotted' and 'striped' forms and the observation of intermediate forms bearing stripes with spots. Using the electrophoretic methodology, it was investigated whether or not the Philippines represents a transition area where both subspecies intergrade and interbreed.

While undertaking research on some aspects of the biology of Philippine spiny lobsters, both 'striped' and 'spotted' forms of *P. longipes* were caught in the reef areas around San Vicente, Cagayan (18°30.6'N and 122°08'E) in the north-eastern-most part of Luzon Island, Philippines, comprising 12% and 3% of the landed catch, respectively. Surveys in Guiuan, Eastern Samar (10°44'N and 125°43'E) also revealed that both subspecies are sympatric in these areas. The 'striped' form, *P. longipes femoristriga* has not been reported previously in Philippine waters while *P. longipes longipes* had been previously reported from Zamboanga and Palawan (George and Holthius, 1965). In this study, *P. longipes longipes* was found to be commonly caught from waters off Eastern Samar, Pangasinan, Zambales, Cavite, Batangas, Mindoro, and Cebu.

The 'spotted' and 'striped' forms are morphologically similar in all body characters except for the markings on the legs and on the abdomen. The 'spotted' form collected from Bolinao, Pangasinan and Calatagan, Batangas typified that described by George and Holthius (1965). Five white spots are obvious on the dorsal surface of the legs which are situated at the distal regions of the propodus, carpus and merus with the two remaining spots in the central region of the merus; these spots interrupt an orange longitudinal line. The abdomen is spotted with large white dots. The 'striped' form collected from San Vicente, Cagayan has a thin, almost continuous longitudinal line on the dorsal surface of the merus, carpus and propodus; the abdomen is spotted with smaller dots. Intermediate forms collected from San Vicente, Cagayan and Guiuan, Samar exhibited variable pattern combinations: clear white spots on the fifth leg and blotches on the other legs; two longitudinal lines on the dorsal surface of the merus and carpus interrupted by white spots; all variable specimens had large white spots on the abdomen.

Electrophoretic analysis of 'spotted' samples from Bolinao (n=16) and Calatagan (n=4) and 'striped' samples from San Vicente (n=30) showed that at 14 enzyme loci examined, both forms shared alleles in 13 but diverged in a single locus, glyceraldehyde-3-phosphate dehydrogenase (Gapdh, E.C. No. 1.2.1.12). The 'spotted' form displayed a faster fixed allele with a relative mobility of 150 compared to the 'striped' form (rm 125). On the other hand, intermediate forms examined from San Vicente, Cagayan (n=7) were polymorphic for both alleles. This divergence even at a single locus is sufficient evidence of the existence of independent gene pools (Shaklee *et al.*, 1982) and therefore they can be rightfully considered subspecies at least. The polymorphism observed in intermediate forms is a strong indication of interbreeding between the two *P. longipes* subspecies. Intraspecific variations in *P. echinatus* (Vianna, 1986) consisting of "large-spotted", "small-spotted" and intermediate forms, might be a similar phenomenon.

As mentioned earlier, *P. longipes femoristriga* is reported to inhabit the eastern portion of the species' range from Japan, the Mollucas, Papua New Guinea, northeastern Australia to Polynesia (George and Holthius, 1965) and throughout the American Samoa, Guam and North Mariana Islands (MacDonald, 1979). It is conceivable that larvae from islands in the Central Pacific (e.g. Palau) may be transported by the North Pacific Equatorial Current which branches to the north as the Kuroshio and to the south as the Mindanao current off Luzon at latitude 13–14°N (Nitani, 1970). Considering this, sympatric occurrences and interbreeding of these subspecies may also be the case in other localities particularly along the Philippine Pacific coast.

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